

SHURBANOV, V1.

Vivid interest for chemistry and its application in everyday
life. Khim i industriia 36 no.6:232 '64.

SHURBANO, Vl., inzh.

The nation-wide scientific technological conference on silicate industry. Khim i industriia 34 no.6:236-237 '62.

SHURBANOV, Vl., inzh.

A meeting on the exchange of experiences in the food and tobacco industries. Tekh dele 501; 2, 30 N '63.

SHURBANOV, VI.

Scientific technical conference at the Chemical Pharmaceutical
Works, Sofia. Khim i industriia 36 no.10:393 '64.

SHURCHILOV, A G.

19

CA

Pretreatment of glass surfaces prior to application of
gelatinous emulsions... A. G. Shurchilov, U.S.S.R.
69,991, Dec. 31, 1947. The glass is treated first with a
dil. mineral acid and then with an alk. soln. M. Hoesch

PROTSENKO, P.I.; SHURDUMOV, G.K.

Liquidus of the ternary reciprocal system consisting of rubidium and strontium nitrites and nitrates. Zhur. neorg. khim. 7 no. 7:1644-1647
Jl '62. (MIRA 16:3)

1. Rostovskiy-na-Donu gosudarstvennyy universitet.
(Rubidium compounds) (Strontium compounds) (Systems (Chemistry))

PROTSENKO, P.I.; SHURDUMOV, G.K.

Fusibility of the reciprocal system Cs, Sr || NO₂, NO₃. Izv.vys.ucheb.
zav.;khim.i khim.tekh. 6 no.5:707-711 '63. (MIRA 16:12)

1. Rostovskiy-na-Donu gosudarstvennyy universitet, kafedra obshchey
i neorganicheskoy khimii.

SHURDUMOV, G.K.; PROTSSENKO, P.I.

Properties of solutions in the systems NaNO_2 - $\text{Sr}(\text{NO}_2)_2$ -
 H_2O and KNO_2 - $\text{Sr}(\text{NO}_2)_2$ - H_2O at 25°C . Zhur. neorg.
khim. 9 no.5:1237-1241 My '64.

(MIRA 17:9)

1. Rostovskiy gosudarstvennyy universitet.

PROTSNED, P.I.; SHURDUMOV, G.K.

Differential thermal analysis of binary systems formed by
alkali metal nitrites and strontium. Zhur. neorg. khim. 9
no.7:1692-1695 J1 '64. (MIRA 17:9)

1. Rostovskiy gosudarstvennyy universitet.

PROTSENKO, P.I.; SHURDUMOV, G.K.

Physicochemical properties of the systems $\text{KbNO}_2 - \text{Sr}(\text{NO}_2)_2 - \text{H}_2\text{O}$ and
 $\text{CaNO}_2 - \text{Sr}(\text{NO}_2)_2 - \text{H}_2\text{O}$ at 25°C . Zhur. fiz. khim. 39 no.3:613-616 Mr
'65. (MIRA 18:7)

1. Rostovskiy-na-Donu gosudarstvennyy universitet.

BOGOMOLOV, N.Y.; KALUSOV, G.K.

solubility, electroconductivity, viscosity, and density in the
systems $\text{RbNO}_2 - \text{Sr}(\text{NO}_2)_2 - \text{H}_2\text{O}$, $\text{CsNO}_2 - \text{Sr}(\text{NO}_2)_2 - \text{H}_2\text{O}$ at 25°C .
Zhur. neorg. khim. 10 no.2:480-484 F '65. (MIRA 18:11)

1. Rostovskiy-na-Donu gosudarstvennyy universitet. Submitted
Sept. 2, 1963.

LAGUNOV, V.; SHUREMOV, A.; TROFIMOV, M.; KOSTYKOV, I., slesar';
FERULEV, A.

In organizations of our society. Izobr.i rats. no.10:
16-17 0 '59. (MIRA 13:2)

1. Predsedatel' Yakutskogo oblastnogo soveta Vsesoyuznogo obshchestva izobretateley i ratsionalizatorov (for Lagunov).
 2. Starshiy inzhener byuro tekhnicheskoy informatsii i izobretatel'stva, L'vov (for Shuremov).
 3. Predsedatel' soveta Vsesoyuznogo obshchestva izobretateley i ratsionalizatorov Vel'giyskoy bumazhnoy fabriki, g.Borovichi (for Trofimov).
 4. Zavod "Soyuz," predsedatel' soveta Vsesoyuznogo obshchestva izobretateley i ratsionalizatorov, Leningrad (for Kostykov).
 5. Predsedatel' zavodskoy organizatsii Vsesoyuznogo obshchestva izobretateley i ratsionalizatorov Lys'venskogo metallurgicheskogo zavoda, g.Lys'va, Permskoy oblasti (for Ferulev).
- (Efficiency, Industrial)

SHURENKOVA D.I.
EXCERPTA MEDICA Sec 7 Vol 13/1 Pediatrics Jan 59

267. THE DIAGNOSIS OF TOXOPLASMOSIS DURING LIFE AND POST MORTEM
(Russian text) - Shurenkova A.I. - ZDRAVOOKHR. TADZH. 1956,
5 (8-13)

In the diagnosis of human toxoplasmosis during life specific serological reactions are used, viz.: the dye test of Sabin-Feldman and the CFT. In the acute initial period of the disease there is a high titre to the dye test and after 2-3 weeks the CFT is positive. If at this stage the titre to the dye test is not falling, we may assert the toxoplasmic aetiology of an acute febrile or cerebral disease. If the dye test is positive on both occasions but the CFT negative, then we should think of residual antibodies from a previous illness and look for some other aetiology. The most convincing proof of toxoplasmic aetiology is detection of the single-cell parasite *Toxoplasma gondii*, most often found in the centrifuge deposit of CSF in needle biopsy of lymph glands and in smears from the tissue biopsy. In the post-mortem diagnosis it is easiest to find the parasites in smear impressions of pieces of organs, stained with the Romanowsky-Giemsa method. (S)

USSR / Zooparasitology. General Problems.

G-1

Abs Jour: Ref Zhur-Biol., No 20, 1958, 90988

Author : Shurenkova, A. I.

Inst : Not given

Title : Certain Findings in the Study of Human Parasitic
Diseases in Tadzhikistan

Orig Pub: Zdravokhr. Tadzhikistana, 1957, No 6, 23-30

Abstract: No abstract

Card 1/1

KOMAROV, Ye.V.; PUSHLENKOV, M.F. ; SHURENKOVA, M.Ye.

Factors determining the distribution of inorganic acids between
aqueous and organic phases. Trudy Kom.anal.khim. 14:47-58 '63.
(MIRA 16:11)

SHURENOK, V. S.

"The Comparative Characteristics of the Clinical Manifestations of Typhoid Fever, Paratyphoid Fever A, and Paratyphoid B in Adults." Cand Med Sci, L'vov Medical Inst, L'vov, 1955. (KL, No 15, Apr 55)

SO: Sum. No. 704, 2 Nov 55 - Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (16).

SHURGALINA, P. P.

Growth - Study and Teaching

Teaching the subject "Physiological characteristics of the growing organism" (8th grade).
Est. v shkole No. 2, 1952.

9. Monthly List of Russian Accessions, Library of Congress, July 1952. 1953, Uncl.

AUTHOR: Shurgal'skiy, E. F., Engineer SOV/119-58-10-3/19

TITLE: The Operation of Valves With Rubber Packings (Rabota klapanov s rezinovym uplotneniyem)

PERIODICAL: Priborostroyeniye, 1958, Nr 10, pp 7-11 (USSR)

ABSTRACT: Air-crew masks, oxygen masks and pneumatic regulators must have valves that close perfectly. The conditions for a perfect operation of the valve packings are derived theoretically and experimentally or are investigated, respectively. This investigation covers the two valve systems:
a) Valve with direct action, gas pressure "under the valve".
b) Nonreturn valve, gas pressure "on the valve".
Especially the sealing forces are derived.
The correct operation of the valves is checked experimentally. For the production of the valve seat an especially useful shape is given. The main attention has to be paid to the smoothness of the seat face (vvv 9 or vvvv 10). The relative pressure on the packing material which has to be applied to the unit of length of the valve seat to secure an absolute tightness is measured. (It is expressed by α in kg/cm). The

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The Operation of Valves With Rubber Packings

SOV/119-58-10-3/19

α -values are determined for the following diameters of the valve seats: 6.2; 4.2; 2.9 and 2.2 mm, with rubber of the type V-14 - 2 mm thick - (hardness according to Shore = 80 - 82), and of the type N-14, group G - 3.4 mm thick (hardness according to Shore = 68 - 74) being used.

The dependence measured between the sealing force and the gas pressure to be controlled takes a linear course.

Also the increase of the sealing force was experimentally determined in the case that the sealing valve is tilted by 1 degree to the valve seat. From the graph obtained may be concluded that the increase of the sealing force is linearly proportional to the diameter of the valve seat and that it practically does not depend on the thickness and the hardness of the rubber. There are 7 figures and 7 references, 7 of which are Soviet.

Card 2/2

SHURGAL'SKIY, E.F.

Performance of the rubber and metal valves. Kauch. i rez. 22
no.8:14-18 Ag '63. (MIRA 16:10)

1. Moskovskiy institut khimicheskogo mashinostroyeniya.

SHURGANOV, Ya.

Useful practice. Avt.transp. 40 no.5:55 My '62. (MIRA 15:5)
(Transportation, Automotive)

KECHKER, M.I., SHURGAYA, Sh.I.

Study of the vectorcardiogram in healthy subjects. Klin.med.
36 no.8:87-93 Ag '58 (MIRA 11:9)

1. Iz pervoy kafedry terapii (zav. - deystvitel'nyy chlen AMN
SSSR prof. M.S. Vovsi). Tsentral'nogo instituta usovershenstvovaniya
vrachey.

(VECTORCARDIOGRAPHY,
in healthy subjects (Rus))

SHURGIN, A.M.

New 1541-type open-side boring and turning lathe. Stan. i instr.
28 no.11:19-21 N '57. (MIRA 10:12)
(Lathes)

PHASE I BOOK EXPLOITATION

SOV/4753

Safronovich, A.A., M.V. Bulatov, and A.M. Shurgin

Karusel'nyye stanki; konstruktsiya i ekspluatatsiya (Vertical Boring Mills: Construction and Operation) Moscow, Mashgiz, 1960. 174 p. 8,000 copies printed.

Managing Ed. for Literature on Metal Working and Machine-Tool Making (Mashgiz):
V.I. Mitin, Engineer; Ed. of Publishing House: N.A. Ivanova; Tech. Ed.:
V.D. El'kind.

PURPOSE: This book is intended for technical personnel concerned with the operation of vertical boring mills at factories and for operators interested in improving their skills. It may also be used by students at schools of higher technical education as supplementary material for the course on "Metal-Cutting Machine Tools."

COVERAGE: The authors describe the construction of Soviet and non-Soviet vertical boring mills. The book contains information on basic subassemblies, special constructional features, and modern constructions of these mills. Vertical boring mills are classified according to standard size and purpose. Trends in

Card 1/4

Vertical Boring Mills (Cont.)

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the construction of modern vertical mills are discussed and instructions are given for servicing and operating these mills. No personalities are mentioned. There are 30 references, all Soviet.

TABLE OF CONTENTS:

The Purpose and Standard Sizes of Vertical Boring Mills	3
Description of the Constructions of Vertical Boring Mills	5
Non-Soviet Vertical Boring Mills	28
Description of the Construction of Vertical Boring-Mill Subassemblies	32
Frames for single-column mills	32
Portal-type frames	34
Beds and tables	35
Crossrails	51
Tool heads	58
Speed drive	75

Card 2/4

CHUDIN, V. M.

"V-shaped (delta) wing in a supersonic flow."

The supersonic flow of gas past conical bodies representing a delta wing, the stabiliser of a missile, a fuselage with a delta-shaped wing and a fuselage with a stabiliser are investigated in this paper. The thickness of the body and the inclination angles relative to the incident flow are assumed as being sufficiently small. Formulae are given determining the distribution of the pressure along the bodies and of the aerodynamic coefficients $c_y, c_x, c_z, c_m, c_{m_z}$.

In an appendix these coefficients are calculated.
(First published in 1949).

Symposium of Theoretical Work on Aerodynamics, Oborongiz, 1957, 3,000 copies,
Central Aero-Hydrodynamics Inst. imeni Prof. N. Ye. Zhukovskiy.

CHAYCHIN, V. N.

"Flow past wings with deflected ailerons at supersonic speeds."

The flow past ailerons of a supersonic gas flow is considered in presence of a wing located under a zero incidence angle. It is assumed that the thickness of the wing and of the ailerons and the angles of deflection of the ailerons are sufficiently small. Seven fundamental cases are considered depending on the shape of the wing and the ailerons and on the Mach number of the incident flow. For each case formulae are given for calculating the pressure distribution (para. 2). In para. 3 the formulae are derived for determining the aerodynamic characteristics of the aileron for the first case. The results obtained in this paper can also be utilized for the aerodynamic calculation of other control organs of aircraft. (First published in 1949).

Symposium of Theoretical Work on Aerodynamics, Oborongiz, 1957, 3,000 copies,
Central Aero-Hydrodynamics Inst. imeni Prof. N. Ye. Zhukovskiy.

L 49441-65 EWT(1)/EWG(v)/FCC/EEC-4/EEC(t)/EWA(h) Po-4/Pe-5/Pq-4/Pae-2/Peb/

Pi-4 GW

ACCESSION NR: AP5009654

UR/0293/65/003/002/0336/0340

AUTHOR: Pletnev, V. D.; Shuridin, G. A.; Shalimov, V. P.; Shvachunov, I. N. 44 B

TITLE: Dynamics of the geomagnetic trap and the origin of radiation belts

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 2, 1965, 336-340

TOPIC TAGS: magnetosphere, solar wind, geomagnetic field, magnetic storm, force line, proton belt, electron belt

ABSTRACT: The boundary of the magnetosphere created by the interaction between the solar wind and the geomagnetic field reaches a distance of 10 terrestrial radii on the day side of the earth. Electric currents on the boundary increase the magnetic field there. On the night side the magnetosphere is very extended. A particle may pass through the boundary of the magnetosphere because of a radial drift of the particle in an asymmetric magnetic field. The physical processes are studied in a magnetic field from parallels $\pm 70^\circ$. The regions permitting and prohibiting particle motion are determined.

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I. 4044-1-55

ACCESSION NR: AP5009654

following Stormer's theory. Boundary currents diminish the magnetic field at neutral points. This effect shows up in the beginning of a magnetic storm. The combination of the current field and the dipole serves to straighten the force lines in the magnetosphere and stretch them towards the solar wind. The proton belt is nearer the earth than the electron belt. Orig. art. has: 3 figures and 2 formulas. [EG]

ASSOCIATION: none

SUBMITTED: 31Dec64

ENCL: 00

SUB CODE: AA, ES

NO REF SOV: 004

OTHER: 011

ATD PRESS: 3245

Cord

2/2

KUDRIN, V.S.; KUDRINA, M.A.; SHURIGA, T.N.; GINZBURG, A.I., glavnyy red.;
APEL'TSIN, F.R., zamestitel' glavnogo redaktora; CHERNYSHEVA,
L.V., red.; BEUS, A.A., red.; GREKULOVA, L.A., red.;
GRIGOR'YEV, V.M., red.; ZABOLOTNAYA, N.P., red.; MATIAS, V.V.,
red.; POKALOV, V.T., red.; RODIONOV, G.G., red.; STEPANOV, I.S.,
red.; CHERNOSVITOV, Yu.L., red.; SHMANENKOV, I.V., red.

[Rare-metal metasomatic formations associated with subalkaline
granitoids.] Redkometal'nye metasomaticheskie obrazovaniia,
svyazannye s subshchelochnymi granitoidami. Moskva, Nedra,
1965. 145 p. (Geologiya mestorozhdenii redkikh elementov,
no.25) (MIRA 18:8)

EXCERPTA : EDICA Sec 6 Vol 13/7 Internal Med. July 59

3860. TREATMENT OF THYROTOXIC CASES WITH POTASSIUM PERCHLORATE ($KClO_4$) (Russian text) - Shurigin D. Ya. - KLIN. MED. (Mosk.) 1958, 36/3 (87-93) Tables 1

Most of the 25 patients were sufficiently improved. K perchlorate acts somewhat more slowly than methylthiouracil. Side effects (goitre and leucopenia) were slighter than those of thiourea derivatives.

SHURIK, R. E.

GUREVICH, Boris Samsonovich; MAKHOTINA, Nina Grigor'yevna; SHURIK, Rakhil
Klyukomovna; BORISOVA, G.A., red.; SUDAK, D.M., tekhn. red.

[Fur articles, sheepskin coats, knit goods, sundries, perfumes
and cosmetics; student manual for merchandise departments of
institutes of Soviet commerce] Tovary: Pushno-mekhovye, ovchinno-
shubnye, trikotazhnye, galantereynye, parfiumerno-kosmeticheskie;
uchebnoe posobie dlia tovarovednykh otdelenii tekhnikumov sovetskoi
torgovli. Moskva, Gos. izd-vo torg. lit-ry, 1957. 288 p.
(Commercial products) (MIRA 11:7)

L 27887-65 EWP(1) GS

ACCESSION NR: AT5003952

S/0000/64/000/000/0286/0298

AUTHOR: Malinovskiy, B. N.; Shurikhin, V. I.; Spynu, G. A.

TITLE: Digital method in the technology of design and manufacture of ship's hull parts

SOURCE: Nauchno-tekhnicheskoye obshchestvo priborostroitel'noy promyshlennosti. Nauchno-tekhnicheskoye soveshchaniye. 3d, Moscow, 1962. Vychislitel'naya tekhnika dlya avtomatizatsii proizvodstva (Computer technology for the automation of production); trudy soveshchaniya. Moscow, Izd-vo Mashinostroyeniye, 1964, 286-298

TOPIC TAGS: program control, control computer, production planning, shipbuilding

ABSTRACT: The article describes a digital-computer-controlled automatic steel-plate acetylene cutter for shipbuilding use, intended for automatization of laying out and cutting flat sheets of irregular shape. The heart of the control system is the transistorized UMShN (general purpose control computer) developed by Vychislitel'nyy tsentr (Computation Center) AN UkrSSR. The program is recorded on 7 tracks of standard 35-mm perforated magnetic tape. The cutter motion program is

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written in unitary code, and the technological commands as sinusoidal signals with approximate frequency 800 cps. The use of an interpolator makes it possible to move the cutter in steps of 0.2 mm. Some features of the interpolator are described. Some of the possibilities afforded by the introduction of computers into hull construction practice are discussed. It is pointed out in the conclusion that to take full advantage of programmed control, it is necessary to revise some of the existing hull design procedures. Orig. art. has: 5 figures, 3 formulas, and 3 tables.

ASSOCIATION: None

SUBMITTED: 01Sep64

ENCL: 00

SUB CODE: IE

NR REF SOV: 006

OTHER: 000

Card 2/2

SHURIKHINA, G. M.

Shurikhina, G. M. - "Exchange adsorption on cellulose materials," --In table of contents third author: T. I. SHURIKHINA --- Materialy Tsentr. nauch.-issled. in-ta bumazh. prom-sti, Issue 37, 1948, p. 83-106 --- Bibliog: p. 104-06

So; U-3566, 15 March 53, (Letopis 'Zhurnal 'nykh Statey, No. 13, 1949)

SOV/137-57-11-22236 D

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 11, p 225 (USSR)

AUTHOR: Shurin, A.K.

TITLE: Phase Diagrams of the Iron-Arsenic and the Iron-Carbon-Arsenic Systems (Diagramma sistemy zhelezo-mysh'yak i sistemy zhelezo-uglerod-mysh'yak)

ABSTRACT: Bibliographic entry on the Author's dissertation for the degree of Candidate of Technical Sciences, presented to the In-t chernoy metallurgii AN USSR (Institute of Ferrous Metallurgy, Academy of Sciences, UkrSSR) Dnepropetrovsk, 1957

ASSOCIATION: In-t chernoy metallurgii AN USSR (Institute of Ferrous Metallurgy, UkrSSR), Dnepropetrousk

Card 1/1

SHURIN, A.K.

12025* (Russian.) A More Precise Determination of the
Equilibrium Diagram of the Fe-As System. Utochnenie dia-
grammy sostoianiia sistemy zhelezo-mysh'insk. V. N. Svech-
nikov and A. K. Shurin. Akademii Nauk Ukrain'skoi RSR,
Dopovid, no. 1, 1957, p. 27-29.
Alloys studied contained 0 to 12.5% As, 0.016 to 0.020% C.
The liquidus and solidus curves and the boundaries of the
 $\alpha + \gamma$ field were determined.

fra RG
conf

SHURIN, A.K.; SVYECHNIKOV, V.M., akademik.

Investigation of the equilibrium diagram of an Fe-C-As
system in the region of iron-rich alloys. Dop. AN URSR no.
2:138-140 '57. (MLRA 10:5)

1. Akademiya nauk URSR (for Svyechnikov). 2. Institut metalofiziki
AN URSR.

(Iron alloys--Metallography)

137-58-5-10520

Translation from Referativnyy zhurnal. Metallurgiya. 1958, Nr 5, p 234 (USSR)

AUTHORS. Svechnikov, V.N., Shurin, A.K.

TITLE. The Iron-arsenic Phase Diagram (Diagramma sostoyaniy zhelezo-mysh'iyak)

PERIODICAL. Sb. nauchn. rabot In-ta metallofiz. AN UkrSSR, 1957
Nr 8, pp 51-57

ABSTRACT: The alloys were made in a Tammann furnace in a current of Ar with electrolytic Fe and an As alloying compound, the latter being produced by briquetting of 30% powdered As and 70% electrolytic Fe. The liquidus line was determined by thermal analysis in a Kurnakov pyrometer. Homogenizing of the alloys was performed at 800-1200°C. The investigation was by the study of the quenched microstructure. In alloys with Fe, As forms an enclosed γ field. The concentrations of solid α and δ solutions in equilibrium at 1150°, in which the γ loop is of maximum extent, were found to be 1.75 and 4.2% respectively. The eutectic transformation temperature was found to be 840°. The maximum solubility of As in α -Fe, determined by X-ray analysis of the structure, is 12.4% and 840° and 5% at room temperature. L. V.

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1. Arsenic-iron alloys--Phase studies

137-58-6-13258

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 298 (USSR)

AUTHORS: Shurin, A.K., Svechnikov, V.N.

TITLE: The Iron-carbon-arsenic Alloys (Sistema zhelezo-uglerod-mysh'yak)

PERIODICAL: Sb. nauchn. rabot In-ta metallofiz. AN UkrSSR, 1957, Nr 8, pp 58-64

ABSTRACT: The alloys were smelted of metallic As (96%), Armco Fe, electrolytic Fe, and an alloy containing $\sim 5\%$ C in a Tammann furnace. Homogenization was done at $900-1200^{\circ}\text{C}$ during 6-8 hr, which fully eliminated dendritic liquation of As. Investigation was conducted by the methods of differential dilatometric analysis and by microstructural methods of measuring of resistivity during heating. Four cross sections were constructed for constant As contents: 0.8, 1.4, 2.8, and 4.5%. As was above points A_1 and A_3 . At 1.75% As the $\alpha + \gamma$ and $\delta + \gamma$ regions unite. At 2.4% As the α and δ regions unite. The temperature of the solidus drops sharply with an increase in As content (by $220-320^{\circ}$ depending on C content.) The temperature of the eutectic transformation $L \rightleftharpoons \gamma + \text{Fe}_3\text{C}$ with 4.5% As

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137-58-6-13258

The Iron-carbon-arsenic Alloys

decreases to 960°. In Fe-C-As alloys As is fully dissolved in ferrite. A structural abnormality was detected: hypoeutectoid cast alloys contain more ferrite than annealed ones, while both cast and annealed hypereutectoid alloys contain structurally free ferrite.

A.V.

1. Arsenic-carbon-iron alloys--Properties
2. Arsenic-carbon-iron alloys--Micro-structure
3. Arsenic-carbon-iron alloys--Temperature factors

Card 2/2

SVECHNIKOV, V.N.; KOCHERZHINSKIY, Yu.A.; PAN, V.M.; SHURIN, A.K.

Investigating chromium-niobium-vanadium alloys. Issl. po zharopr.
splat. 3:168-177 ' 58, (MIRA 11:11)

(Chromium-niobium-vanadium alloys—Metallography)
(Phase rule and equilibrium)

SOV/126-6-4-13/34

AUTHOR: Svechnikov, V.N.,
Pan, V.M.
Shurin, A.K.

TITLE: Effect of Phosphorus and Arsenic on the Lattice Parameter and Hardness of α -Iron (Vliyaniye fosfora i mysh'paka na parametr kristallicheskoy reshetki i tverdosť al'fa-zheleza)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol. 6,
Nr 4, pp 662-664 (USSR)

ABSTRACT: High purity electrolytic iron was used for the preparation of the experimental Fe-P and Fe-As alloys melted in vacuum (10^{-4} mm Hg) in the former, and in argon in the latter case. The alloying elements were introduced in the form of master alloys of the eutectic composition (10.5% P or 30% As) prepared by powdered metallurgy methods (sintered in evacuated quartz ampoules). No losses of the alloying elements occurred on smelting, and the carbon content of the Fe-P and Fe-As alloys was 0.004 - 0.010% and 0.016 - 0.020% respectively. To remove the segregation effects the

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SOV/126-6-13/34

Effect of Phosphorus and Arsenic on the Lattice Parameter and
Hardness of α -Iron

alloys were subjected to a homogenising diffusion annealing treatment in the single (α or γ) phase temperature region. The powder specimens for the X-ray analysis prepared by filing were annealed for 2 hrs at 800-1050°C, i.e. in the α -phase region, and cooled rapidly. For determining the macro and micro-hardness numbers, the Vickers hardness testing machine (5 or 20 kg load) and a PMT-3 micro-hardness tester (5 or 30 g load) were used. The results of the X-ray measurements reproduced graphically show that the lattice parameter of α -iron is decreased by phosphorus (Fig.1) and increased by arsenic addition (Fig.2). Deviation from the additivity law, negative in the former and positive in the latter case, was observed. Values of the lattice parameter of the α -phase in alloys annealed in the two-phase region are also given. (The Fe-P alloys were annealed at 400, 650, 835 and 1000°C for 150, 45, 3 and 1.5 hrs respectively, the annealing conditions for the Fe-As alloys being 150, 65,

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SOV/126-6-4-13/34

Effect of Phosphorus and Arsenic on the Lattice Parameter and
Hardness of α -Iron

45 and 10 hrs at 400, 500, 650 and 810°C)
From these data solid solubility of P and As in α -iron
at various temperatures was determined. The solid
solubility curve of phosphorus in α -iron is shown on
Fig.3, that showing solubility of arsenic in α -iron
is reproduced in another article (Ref.12). Both
phosphorus and arsenic were found to increase hardness
of α -iron. The micro and macro-hardness curves
(graphs a and b) for the Fe-P and Fe-As Alloys are
shown on Fig.4 and 5 respectively. The difference
between the values of micro and macro-hardness are
attributed to the fact that the former was determined

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SOV/126-~~6-4-13~~/34

. Effect of Phosphorus and Arsenic on the Lattice Parameter and
Hardness of α -Iron

on cold-worked and the latter on annealed specimens.
There are 5 figures and 12 references of which 2 are
Soviet, 4 English, 3 German, 1 Ukrainian and 2 Norwegian.

ASSOCIATION: Institut Metallofiziki AN USSR
(Institute of Metal Physics, AS UkrSSR)

SUBMITTED: 26th September 1957.

Card 4/4

18(4,7); 25(1)

SOV/2306

Academiya nauk Ukrainy SSR. Institut metallofiziki

Voprosy fiziki metallov i metallovedeniya (Problems in the Physics of Metals and Metallography) Kiyev, Izd-vo AN Ukrainy SSR, 1959. (Series: Ite: Shornik nauchnykh rabot, Nr 9) Errata slip inserted. 3,000 copies printed.

Ed. of Publishing House: V.L. Shkurko; Tech. Ed.: M.I. Yefimova; Editorial Board: V.N. Svechnikov, Academician, Academy of Sciences of Ukrainian SSR (Resp. Ed.); S.D. Gertsiken, Doctor of Physical and Mathematical Sciences; and I.Ya. Dekhtyar, Doctor of Technical Sciences.

PURPOSE: This collection of articles is intended for scientific workers, aspirants, and engineers in the fields of the physics of metals, metallography, and metallurgy. It may also be useful to students of advanced courses in metallurgical and physical faculties.

COVERAGE: This collection of articles deals with the following topics: effect of high-speed heating, heat treatment, deformation, and crystallization conditions on phase transformations, structures, and properties of metals and alloys; the effect of additional alloying components on volumetric and intercrystalline diffusion in alloys; and the effect of repeated quench hardening and radioactive and ultrasonic treatment on the physical properties of alloys. No personalities are mentioned. References follow several of the articles.

Svechnikov, V.N., and A.Ye. Spector. Investigation of Transformations in the Solid State of Cobalt-Rich Co-Cr Alloys. 105

Changes in cobalt-base solid solutions and a more precise determination of phase ranges in equilibrium diagrams of the Co-Cr system are investigated. The microstructure of alloy samples is discussed.

Svechnikov, V.N., Yu.A. Kochershinak, Ye.Ye. Maystrenko, V.M. Pan, and A.K. Shurin. Investigation of the Co-Nb-V Alloy System. 120

Constitution diagrams and microstructures of various binary and ternary alloys were investigated. Changes of hardness with changes of temperature are shown.

Lesnik, A.G., and G.V. Kharukova. Displacement of Equilibrium Curves of α' - and δ' -phases in the Fe-Cr Alloy System due to Prolonged High-Temperature Heating of the γ -Phase. 133

Electrolytic chromium and iron were used for making the alloys. Spiral samples, 20mm. long, were heated in a vacuum (10⁻⁴ mm. Hg), and electrical resistivity was measured. The drop of resistivity at the δ -transformation is discussed.

Tikhomirov, Ye.A. Anisotropy in the Diffusion in Cu-Au Alloys Undergoing Ordering. 139

The calculation of diffusion coefficients for alloys undergoing ordering is made analytically by the method of mean energies and by the "configuration method."

Gertsiken, S.D., and M.P. Pryashnikov. Investigation of Volumetric Diffusion of Iron in Alloys. 147

Alloys composed of Fe + 0.27 percent Al, and Fe + 0.39 percent Al, were investigated. Samples, 10 x 15 x 2.5mm., were deformed and annealed. The mean grain size (0.5 to 1.0 μ) did not change after diffusion annealing (770 to 1250°C). The polished surfaces of the samples were coated with radioactive iron (1 to 2 microns thick). The depth of the diffusion layer (100 to 150 microns) varied with temperature and time of annealing.

Gertsiken, S.D., T.K. Yatsenko, and L.P. Slastnikova. Investigation of Diffusion of Cobalt and Iron Along Grain Boundaries of Cobalt, Nickel, and Iron. 154

The absolute values of diffusion coefficients for Co-Co, Co-Ni, Co-Fe, Fe-Fe, and Fe-Ni, i.e., diffusion with regard to time and temperature of annealing, were obtained for grain-boundary diffusion and volumetric diffusion. The relationship between coefficients for both diffusions is discussed.

SHURIN, A.K.

18(7) PHASE I BOOK EXPLOITATION SOV/3355
Akademiya nauk SSSR. Institut metallurgii. Nauchnyy sovet po
probleme zharoprochnykh splavov
Issledovaniya po zharoprochnym splavam, t. IV (Studies on Heat-Resistant Alloys, vol. 4), Moscow, Izd-vo AN SSSR, 1959. 300 p.
Extra slip inserted. 2,200 copies printed.
Ed. of Publishing House: V. A. Klimov; Tech. Ed.: A. P. Guseva;
Editorial Board: I. P. Bardin, Academician; O. V. Kurdyumov,
Academician; M. V. Ageyev; Corresponding Member, USSR Academy of
Sciences: I. A. Ouling, I. M. Pavlov, and I. P. Zudin, Candidate
of Technical Sciences.
PURPOSE: This book is intended for metallurgists concerned with
the structural metallurgy of alloys.
COVERAGE: This is a collection of specialized studies of various
problems in the structural metallurgy of heat-resistant alloys.
Some are concerned with theoretical principles, some with des-
criptions of new equipment and methods, others with properties
of specific materials. Various phenomena occurring under
specified conditions are studied and reported on. For details,
see Table of Contents. The articles are accompanied by a num-
ber of references, both Soviet and non-Soviet.

Studies (Cont.)

Gulyayev, A. P., and I. V. Chernenko. Effect of Plastic Deformation at Low Temperatures on the Heat-Resistant Properties of Type 18-8-Ti Austenitic Steel	214
Savitskiy, Ye. M., and M. A. Tytkina. Recrystallization of the Refractory Metals Titanium, Hafnium, Tantalum, Rhenium, and Tungsten, and Their Alloys	218
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SVECHNIKOV, V.N.; KOCHERZHINSKIY, Yu.A.; PAN, V.M.; MAYSTREMKO, Ya.Ye.;
SHORIN, A.K.

Investigating the chromium - niobium - vanadium system. Issl.
po zharopr.splav. 4:248-246 '59. (MIRA 13:5)
(Chromium-niobium-vanadium alloys)

SVECHNIKOV, V.N.; KOCHERZHINSKIY, Yu.A.; MAYSTRENKO, Ye.Ye.; PAN, V.M.;
SHURIN, A.K.

Investigating the Cr - Nb - V system. Sbor. nauch. rab. Inst.
metallofiz. AN URSR no.9:120-132 '59. (MIRA 12:9)
(Chromium-niobium-vanadium alloys--Metallography)
(Phase rule and equilibrium)

SVECHNIKOV, V.N.; SHURIN, A.K.

Combined effect of manganese and arsenic on transformations in iron-carbon alloys. Sbor. nauch..rab. Inst. metallofiz. AN URSR no.11:53-60. '60. (MIRA 13:11)
(Iron alloys--Metallography) (Phase rule and equilibrium)

25858

S/020/61/139/004/018/025

B103/B206

189200

AUTHORS: Svechnikov, V. N., Academician AS UkrSSR, and Shurin, A. K.

TITLE: The phase diagram iron - hafnium

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 4, 1961, 895-898

TEXT: The authors investigated the system Fe-Hf and drew up its phase diagram (Fig. 3). The properties of Hf have been investigated insufficiently; the authors were unable to find publications on the Fe - Hf phase diagram. This is explained by the fact that so far Hf could not be produced without large amounts of impurities. Its melting point has not been established either, nor the temperature of the allotropic transformation existing in Hf. The authors prepared most of the alloys on the basis of electrolytic iron which was annealed in hydrogen and then in vacuo. Carbonyl iron was used for part of the alloys. After purification, the iron contained a maximum of 0.01% C, Si, Mn, S, P, or N each. The metallic hafnium iodide used contained 0.5% Zr and 0.2% Mo. The 25 alloys prepared were remelted in the arc furnace 5 to 6 times in pure argon. The apparatus used for the thermal

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The phase diagram iron - hafnium

analysis was described previously (V. N. Svechnikov & al., Ref. 12: Mashinostroyeniye, No. 5, 76 (1960)). Tungsten-iridium thermocouples and BP5/20 (VR 5/20) (W + 5% Re — W + 20% Re) were used. The dilatometer is also described in Ref. 12. The phase components of the alloys were determined by X-ray structural analysis. A filtered cobalt K α -radiation in a cylindrical camera was used. The Curie point of the alloys was determined with the anisometer by Akulov [Abstracter's note: Anisometer not stated] (methods: V. G. Permyakov & al., Zav. lab., 21, No. 6, 695 (1955)). The authors established that in alloys with less than 45% Hf four transformations take place in the solid state: Two magnetic ones in α -iron and in the intermetallide, a third which is linked with the transformation of α -iron into γ -iron, and a fourth which corresponds to the transformation of γ -iron into δ -iron. The heat of transformation for $\alpha \rightarrow \gamma$ was determined dilatometrically at a heating rate of up to 0.5 deg/min. The $\alpha \rightarrow \gamma$ transformation took place in the initial iron (C-content up to 0.01%) at a heating rate of 0.2-0.3 deg/min between 894 and 905°C. The heating and cooling dilatograms do not permit the distinction between the transformation $\alpha + \xi \rightarrow \gamma + \xi$ and $\alpha \rightarrow \gamma$. The greatest solubility of Hf in α -Fe (peritectic point) amounts to 0.2%. It was

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The phase diagram iron - hafnium

determined on the basis of the intersection point of the peritectic horizontal with the extrapolated curve of the $\alpha \rightarrow \gamma$ transformation. Characteristic features were a) the temperature increase of the transformation $\alpha + \epsilon \rightarrow \gamma + \epsilon$ with increasing Hf content in alloys, and b) the spreading of the transformation over a considerable temperature interval.

For this reason, the above temperature which amounts to $935 \pm 5^\circ\text{C}$, was determined from the dilatogram of the two-phase alloy ($\alpha + \epsilon$), whose composition lies closest to the peritectic point. The transformation

$\gamma + \epsilon \rightarrow \delta$ takes place on the basis of a eutectic reaction at $1330 \pm 5^\circ\text{C}$. The eutectic alloy contains 2.8% Hf. At 1330°C , the maximum Hf solubility in γ -Fe is 1.6%. In alloys with 70 - 99% Hf, two transformations take place in the solid state: 1) magnetic transformation of the intermetallide; the coefficient of thermal expansion is strongly changed here; 2) eutectic transformation at $1235 \pm 10^\circ\text{C}$ according to the reaction: $\epsilon + \alpha_{\text{Hf}} \rightleftharpoons \beta_{\text{Hf}} + \epsilon$.

2) is accompanied by a noticeable thermal effect and a considerable volume increase (during heating). From this, the authors conclude that the

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solubility of Fe in Hf is low (certainly below 1%). The fusibility diagram was drawn up only on the basis of a differential thermal analysis. The authors established two eutectic transformations in the system Fe - Hf:

A) $L \rightleftharpoons \beta_{\text{Hf}} + \xi$ at $1300 \pm 10^\circ\text{C}$ and B) $L \rightleftharpoons \delta + \xi$ at $1350 \pm 10^\circ\text{C}$. The Hf content in the eutectic alloys is 85 and 21.5%, respectively. The crystal lattice of the alloys containing the intermetallide Fe_2Hf (ξ -phase) was determined by X-ray structural analysis as being hexagonal and of the MgZn_2 type. The

parameters of this lattice were not the same in alloys of various compositions. From this, the authors conclude that a considerable range of homogeneity of the ξ -phase exists in some alloys. The boundaries of

the mono-phase range were found at 1200°C by direct determination of the hafnium content in the ξ -phase. I. D. Marchukova (Institut metallurgii AN SSSR - Institute of Metallurgy, AS USSR) made the chemical analysis of this phase by X-ray structural analysis with the PCAW-2 (RSASH-2) apparatus. In the ξ -phase of alloy no. 18, 50% Hf were formed, and in no. 21 64%. Since Fe_2Hf is ferromagnetic, the Curie point of the ξ -phase was determined

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The phase diagram iron - hafnium

in several alloys, i. e., for various compositions of the ξ -phase. In this way, it was proved that the Curie point drops from 405 to 145°C with an increase of the Hf content in the intermetallide from 50 to 64%. The composition of the ξ -phase in the alloys was changed owing to long annealing (over 100 hr). The Curie point dropped in alloy no. 18 from 405 to 377°C, and in no. 21 it increased from 145 to 170°C. The boundaries of the mono-phase range of the intermetallide were determined in this way. The hardness of the intermetallide (determined with the Vickers device) is 650 kg/mm², and its melting point is 1810±20°C (for stoichiometric Fe₂Hf), which is much higher than that mentioned by R. P. Elliot, W. Rostocker (Trans. Am. Soc. Metals, 50, 617 (1958)). The authors thank I. B. Borovskiy for making the spectral analysis in his laboratory. There are 3 figures, 1 table, and 13 references: 2 Soviet-bloc and 11 non-Soviet-bloc. The two important references to English-language publications read as follows: P. Duwez (Ref. 5: J. Appl. Phys., 22, No. 9, 1174 (1951); H. K. Adenstedt (Ref. 2: Trans. Am. Soc. Metals, 44, 949 (1952)). The third one see in the body of the abstract.

Card 5/6

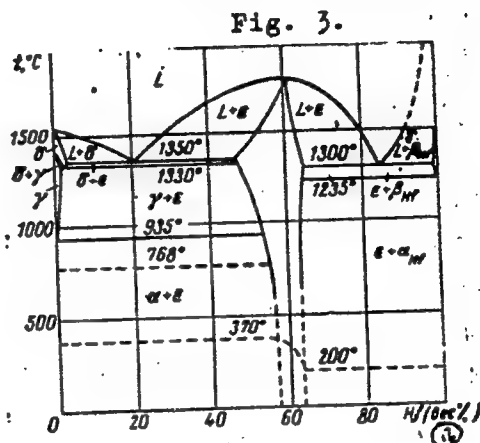
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B103/B206

The phase diagram iron - hafnium

ASSOCIATION: Institut metallofiziki Akademii nauk USSR (Institute of Physics of Metals of the Academy of Sciences UkrSSR)

SUBMITTED: April 18, 1961

Fig. 3: Phase diagram of the system Fe-Hf. Legend: a) % by weight.



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S/601/62/000/016/016/029
E192/E382

AUTHORS: Svechnikov, V.N. and Shurin, A.K.
TITLE: Constitution diagram of the Fe-C-Hf system
SOURCE: Akademiya nauk Ukrayins'loyi RSR. Intsyttut metalofyzyky. Sbornik nauchnykh rabot. no. 16. Kiyev, 1962. Voprosy fiziki metallov i metallovedeniya. 124 - 127
TEXT: In continuation of their earlier work (DAN SSSR, 139, no. 4, 895-898, 1961) on the Fe-Hf system, the authors studied the Fe corner of the Fe-Hf-C constitution diagram, embracing alloys with up to 1.7% C and 20% Hf. High-purity materials were used for the preparation of experimental alloys whose constitution was determined with the aid of thermal and X-ray diffraction analyses, dilatometric measurements and metallographic examination of specimens quenched from various temperatures. Some of the results are reproduced in Fig. 1, showing vertical sections through the Fe-C-Hf system at 0.9, 4, 10 and 20% Hf. The vertical sections at 0.25, 0.55, 1.15 and 1.65% C are shown in Fig. 2. It has been established that the carbide formed in the Fe-Hf-C alloys has the
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S/601/62/000/016/016/029
E192/E382

Constitution diagram of

formula "HfC"; the regular shape of the HfC crystals indicates that they crystallize out of the melt. In general, Hf sharply decreases the width of the single-phase γ -region, considerably increases the C content in the eutectoid and reduces the proportion of pearlite; this constituent is not observed at C concentrations of less than 0.7% in alloys containing 10% Hf. Practically all the C combines with Hf at low C concentrations and cementite is formed only when the C content is higher than that required to combine all the Hf present. There are two four-phase non-variant peritectoid equilibria in the concentration range studied: 1) $(\alpha + K \rightleftharpoons \text{HfC} + \gamma)$ is observed at 735°C , the four participating phases being α -Fe, K-Hf carbide (HfC), HfC - cementite (Fe_3C) and γ -Fe; the other $(\alpha + K \rightleftharpoons \gamma + \epsilon)$ is observed at 920°C , ϵ denoting the intermetallic compound Fe_2Hf . There are 3 figures,

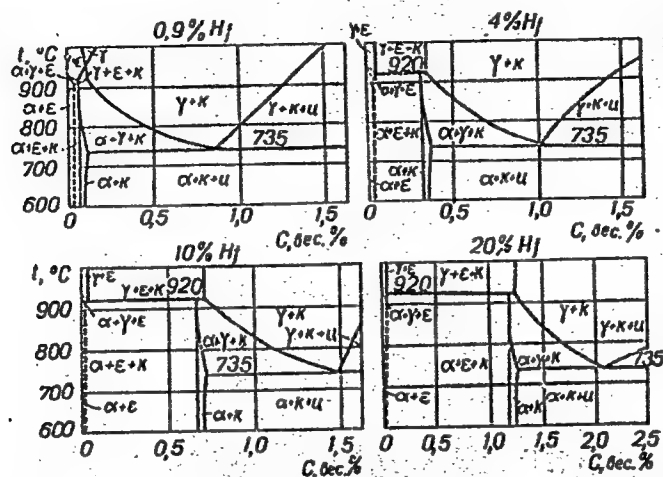
SUBMITTED: January 26, 1962

Card 2/3

Constitution diagram of

S/601/62/000/016/016/029
E193/E383

Fig. 1:



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S/601/62/000/016/029/029
E111/E451

AUTHORS: Svechnikov, V.N., Kocherzhinskiy, Yu.A., Shurin, A.K.,
Pan, V.M., Spektor, A.Ts., Kobzenko, G.F., Boyko, Yu.A.

TITLE: Equipment for the physico-chemical investigations on
high-melting chemically active metals

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut metal'fyziky.
Sbornik nauchnykh rabot. no.16. Kiev, 1962. Voprosy
fiziki metallov i metallovedeniya. 220-230

TEXT: The following equipment has been developed over several
years in the Otdel metallovedeniya (Department of Science of
Metals) of Institut metallofiziki AN UkrSSR (Institute of Physics
of Metals AS UkrSSR) for studying alloys such as chromium-niobium-
vanadium: 1) Arc furnace, including casting facilities, in which
evacuation to 10^{-2} mm is followed by admission of argon to a
pressure of 0.2 atm. [Abstracter's note: 10^{-2} mm is a very poor
vacuum and the equipment would not work as described.] The argon
is then purified in the furnace by a molten titanium getter.
A rotary arrangement enables a clean section of the inspection
window to be moved into position without breaking the vacuum.
2) Argon purification plant in which air and moisture are removed
Card 1/2

Equipment for the physico- ...

S/601/62/000/016/029/029
E111/E451

by calcium chips at 700 to 750°C, through which a 250 litre batch of gas circulates by convection. 3) Installations for annealing specimens in vacuum or argon at temperatures up to 1000°C and up to 2500°C respectively. 4) An installation for differential thermal analysis in an inert medium at temperatures up to 2000°C with novel arrangements for the thermocouple transmitter, thermostat and furnace and taking 0.5 to 1.5 g specimens. Calibration is effected by melting pure metals, the calibration curve then automatically compensating for systematic errors. 5) An inert atmosphere quenching installation (maximum specimen temperature 1400°C). 6) Vertical inert-atmosphere dilatometer and differential dilatometer for temperatures up to 1500°C. There are 10 figures.

SUBMITTED: January 25, 1962

Card 2/2

ACCESSION NR: AT4042839 .

S/2601/64/000/018/0170/0174

AUTHOR: Shurin, A. K.; Dmitriyeva, G. P.

TITLE: Chromium-ruthenium phase diagram

SOURCE: AN UkrSSR. Institut metallofiziki. Sbornik nauchny*kh rabot, no. 18, 1964. Voprosy* fiziki metallov i metallovedeniya (Problems in the physics of metals and physical metallurgy), 170-174

TOPIC TAGS: chromium ruthenium system, chromium ruthenium alloy, alloy phase diagram, alloy composition, alloy solid solution

ABSTRACT: Chromium-ruthenium alloys containing from 2.0 to 58.1 at% Ru were prepared by melting electrolytic 99.9% pure Cr and a powder of 99.86% pure metallic Ru in a nonconsumable electrode-arc furnace in an argon atmosphere. The alloys were annealed at 1500C for 25 hr, 1300C for 130 hr in argon, or at 900C for 150 hr and 800C for 100 hr in a vacuum, and water quenched. The phase diagram of the Cr-Ru system (see Fig. 1 of the Enclosure) was plotted on the basis of the differential thermal analysis. The $\alpha + \beta$ eutectic, where α and β are the solid solutions of Ru in Cr and of Cr in Ru, respectively, is

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ACCESSION NR: AT4042839

formed at $1610 \pm 10^\circ\text{C}$ and contains 37.5 at% Ru. An intermetallic compound RuCr_2 (σ -phase) formed with a peritectoid $\alpha + \beta$ reaction at about 1580°C , has a homogeneity range of ~2 at% Ru (from 35.5 to 37.5 at% Ru). The solubility of Ru in Cr varies from 34 at% at 1600°C to 19 at% at 800°C . The solubility of Cr in Ru varies from 52.5 at% at 1600°C to 46 at% at 900°C . Alloys with 20.2 to 31.4 at% Ru annealed at 800 and 900°C contain a RuCr_3 compound (cubic lattice of the β -W type) and a RuCr_4 compound, the latter probably formed from the supercooled α -phase containing 18—20 at% Ru. With the decomposition of the RuCr_3 compound at 780°C into a mixture of the α and σ phases the alloy expands. The hardness of the α -phase increases from 1519 Mn/m^2 for pure Cr to 8820 Mn/m^2 for the maximum saturated solid solution. The σ -phase has a hardness of 10,388 Mn/m^2 , and the maximum saturated β -phase has a hardness of 2040 Mn/m^2 . Orig. art. has: 5 figures and 1 table.

ASSOCIATION: Institut metallofiziki AN UkrSSR (Institute of Physics of Metals, AN UkrSSR)

SUBMITTED: 20Jan63

ATD PRESS: 3085

ENCL: 01

SUB CODE: MM

NO REF SOV: 003

OTHER: 002

Card: 2/3

ACCESSION NR: AT4042839

ENCLOSURE: 01

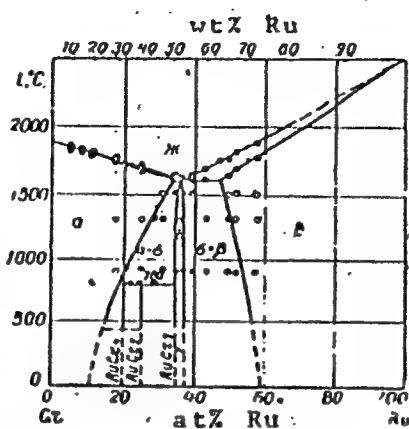


Fig. 1. Cr-Ru phase diagram

Card: 3/3

ACCESSION NR: AT4042840

S/2601/64/000/018/0175/0177

AUTHOR: Shurin, A. K.; Dmitriyeva, G. P.

TITLE: Niobium-cobalt phase diagram

SOURCE: AN UkrSSR. Institut metallofiziki. Sbornik nauchny*kh rabot, no. 18, 1964. Voprosy* fiziki metallov i metallovedeniya (Problems in the physics of metals and physical metallurgy), 175-177

TOPIC TAGS: niobium cobalt system, niobium cobalt phase diagram

ABSTRACT: Thirty niobium-cobalt alloys containing from 14.4 to 99.2 at% Nb were prepared by melting electrolytic cobalt and 99.4% pure niobium in a nonconsumable tungsten electrode-arc furnace in an argon atmosphere. The alloys were annealed in either argon or in vacuum at a temperature ranging from 1300 to 700C for periods varying from 50 to 435 hours. The phase composition was determined by metallographic and x-ray structural analyses, and a phase diagram of the Nb-Co system, based on data from the differential thermal analysis, was plotted (see Fig. 1 of the Enclosure). The intermetallic compound NbCo₃ of the α + NbCo₃ eutectic at 700-1000C is homogeneous at an Nb concentration of 28 to 33 at% and has a melting

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ACCESSION NR: AT4042840

temperature of $1540 \pm 10^\circ\text{C}$. The alloys annealed at 700, 1000, or 1100°C had only the α and NbCo_2 phases. The intermetallic compound β is formed during crystallization at $1440 \pm 10^\circ\text{C}$ and decomposed with the eutectoid reaction $\beta \rightleftharpoons \text{NbCo}_2 + \text{NbCo}$ at $1225 \pm 20^\circ\text{C}$. Decomposition of the β -phase at 1200°C and its formation from the $\text{NbCo}_2 + \text{NbCo}$ mixture can be achieved with 50-hr annealing. The NbCo intermetallic compound is homogeneous in the $700\text{--}1250^\circ\text{C}$ range at a Nb content of 45 to 54 at%. The solubility of Co in Nb, determined at 1250°C , was about 1.57 at% (1 wt%). Two-phase ($\text{NbCo} + \gamma$) alloys contained no other phases. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Institut metallofiziki AN UkrSSR (Institute of Physics of Metals, AN UkrSSR)

SUBMITTED: 20Feb63

ATD PRESS: 3088

ENCL: 01

SUB CODE: MM

NO REF SOV: 001

OTHER: 006

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ACCESSION NR: AT4042840

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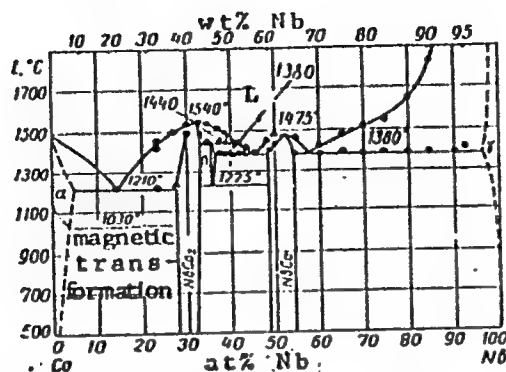


Fig. 1. Niobium-cobalt phase diagram

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S/0021/64/000/005/0600/0603

ACCESSION NR: AP4037443

AUTHOR: Kuz'ma, Yu. B.; Shurin, A. K.; Dmy*triyeva, G. P. (Dmitriyeva, G. P.); Gladyshevskiy, Ye. I. (Gladyshevskiy, Ye. I.)

TITLE: Crystal structure of the beta-phase of the niobium-cobalt system and the solubility of silicon in it

SOURCE: AN UkrRSR. Dopovidi, no. 5, 1964, 600-603

TOPIC TAGS: niobium-cobalt system, beta-phase, beta-phase stabilization, x-ray analysis, space group D sup 4 sub 6h, space group P6 sub 3/mmc, MgZn sub 2 structure, niobium-cobalt-silicon system

ABSTRACT: X-ray analysis was used to establish that the beta-phase of the niobium-cobalt system, existing over the temperature interval 1140-1225C, has the MgZn₂ structure (space group P6₃/mmc -- D_{6h}⁴) with lattice parameters $a = (4.834 \pm 0.002)$ Å, $c = (7.853 \pm 0.004)$ Å, $c/a = 1.624$ for the alloy containing 35.1 atomic % Nb. The beta-phase had been studied earlier by two of the authors,

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ACCESSION NR: AP4037443

A. K. Sh. and G. P. D. (Voprosy* fiziki metallov i metallovedeniya, no. 18, 1963, p. 175). The other authors, Yu. B. K. and Y. I. G. had previously established the existence of the composition Nb_2Co_3Si at $800^{\circ}C$ (Mg_2Cu_3Si structure) in the ternary Nb-Co-Si system. The purpose of this study was to see whether this ternary alloy is a solid solution based on the beta-phase. The results showed the answer to be in the affirmative. They also indicated that the beta-phase of the Nb-Co can dissolve up to 25% atomic % Si, and that the addition of Si can stabilize the beta phase down to 800 C. Orig. art. has one table and one figure.

ASSOCIATION: L'vivs'ky* derzhavny* universy*tet, Insty*tut metalofizy*ky*
AN UkrSSR (L'vov State University, Institute of Metal Physics, AN UkrSSR)

SUBMITTED: 03May63

DATE ACQ: 03Jun64

ENCL: 00

SUB CODE: MM,SS

NO REF SOV: 004

OTHER: 004

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L 13803-65 EWT(m)/EPF(n)-2/EPR/EPA(bb)-2/EWP(b) Ps-4/Pu-4 ASD(f)-2/ASD(m)-3

ACCESSION NR: AT4046825 JD/JG/MLK S/0000/64/000/000/0104/0107

AUTHOR: Svechnikov, V. N.; Shurin, A. K.; Dmitriyeva, G. P.

TITLE: Investigation of alloys of the Nb-NbCr₂-NbAl₃ system

SOURCE: AN SSSR. Nauchnyy sovet po probleme zharoprochnykh splavov. Issledovaniya staley i splavov (Studies on steels and alloys). Moscow, Izd-vo Nauka, 1964, 104-107

TOPIC TAGS: niobium base alloy, niobium chromium aluminum system, niobium aluminum intermetallic compound, niobium chromium intermetallic compound, intermetallic compound niobium alloy, alloy hot hardness, alloy oxidation rate

ABSTRACT: Arc-melted Nb-Al, Nb-Cr, and Nb-Cr-Al alloys were annealed at 1500C for 17-30 hr or at 1200C for 105 hr in an argon atmosphere, and tested for hot hardness in a vacuum at temperatures up to 900C and for oxidation in air at 1100C. At all test temperatures the hardness of Nb-Al alloys increased gradually with the addition of up to 5% Al and increased sharply with further increases in Al content. An almost linear increase in hardness was observed in Nb-Cr alloy containing up to 17% Cr. The hardness of

Card 1/3

E 13803-65

ACCESSION NR: AT4046825

Nb-Cr-Al alloys containing more than 50% intermetallic compounds in the structure also increases appreciably. The oxidation rate of unalloyed Nb and Cr was 83 and $0.59 \text{ mg/cm}^2\cdot\text{hr}$, respectively. Chromium additions (up to 8-10%) decrease the oxidation rate of Nb-Cr alloys more sharply than do subsequent additions. The oxidation rate in these alloys decreases until NbCr_2 starts forming. Fig. 1 of the Enclosure shows the effect of Al on the oxidation rate of Nb-Cr alloys. The oxidation rate of an Nb-Al₃ compound ($0.84 \text{ mg/cm}^2\cdot\text{hr}$) is comparable to that of Cr. Alloys of the NbCr₂-NbAl₃ section have good oxidation resistance. Thus the Nb-Cr-Al system has several Nb-base alloys whose oxidation rate is below that of adjacent alloys containing more or less Al but with the same Cr content. Alloys containing 5-6 wt% Al or 4-7 wt% Cr have their lowest ($5 \text{ mg/cm}^2\cdot\text{hr}$) oxidation rate at 1100C, i.e., 16 times below that of an unalloyed Nb. These alloys have a hardness of 400-470 and 290-350 kg/mm^2 at 20 and 900C, respectively. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: none

Card 2/4

L 13803-65
ACCESSION NR: AT4046825

SUBMITTED: 16Jun64

ENCL: 01

SUB CODE: MM

NO REF SOV: 011

OTHER: 008

ATD PRESS: 3131

Card 3/4

ACCESSION NR: AT4046825

ENCLOSURE: 01

L 13803-65

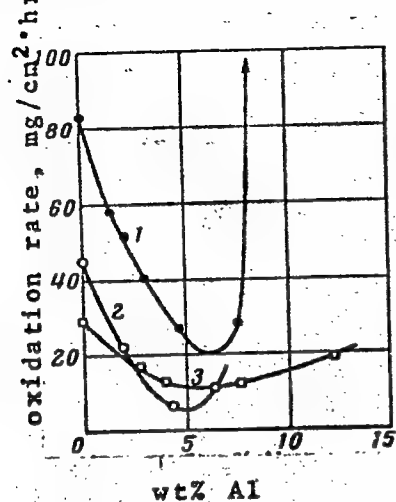


Fig. 1. Effect of aluminum on the oxidation rate of niobium-chromium alloys

1 - Binary Nb-Al alloy; 2 - Nb-Al alloy with 4.5—5% Cr; 3 - Nb-Al alloys with 12—14% Cr.

Card 4 / 4

SHURIN, A.K.; DMITRIYEVA, G.P.

Constitutional diagram of the chromium-ruthenium alloy. Sbor.
nauch. rab. Inst. metallofiz. AN URSR no.18:170-174 '64
(MIRA 17:8)

Constitutional diagram of the niobium-cobalt alloy. Ibid.:175-
177.

L 39919-65 EPF(n)-2/EWP(k)/EWP(z)/EWA(c)/EWT(m)/EWP(b)/T/EWA(d)/EWP(e)/EWP(w)/
EWP(t) Pf-4/Pu-4 IJP(c) JD/JG S/2601/64/000/019/0206/0211

ACCESSION NR: AT5005125

AUTHOR: Svechnikov, V. N. (Academician AN UkrSSR); Shurin, A. K.; Dmitriyeva, G. P.

TITLE: Phase diagram of the Hf-Ta system in the solid state

SOURCE: AN UkrSSR. Institut metallofiziki. Sbornik nauchnykh trudov, no. 19, 1964. Voprosy fiziki metallov i metallovedeniya (Problems in the physics of metals and physical metallurgy), 206-211

TOPIC TAGS: hafnium, tantalum, hafnium tantalum system, hafnium alloy, alloy micro-structure, alloy hardness, tantalum containing alloy composition

ABSTRACT: Sixteen binary Hf-Ta alloys, containing from 2.5 to 95 wt% Ta, are melted in a tungsten electrode furnace in an argon atmosphere, were investigated. Thermal analysis revealed no signs of melting at temperatures up to 1800C. However, an endothermal solid-state transformation was observed at 1000-1050C. A super-saturated β_2 -phase (a solid solution of Ta in Hf), stable at room temperature, was obtained by quenching alloy powders from 1300 and 1500C. The solubility of Hf in Ta was found to be 6, 8.8, 16, and 33 wt% at 900, 1100, 1300, and 1500C, respectively. The x-ray diffraction patterns of Ta and an alloy with 80% Ta showed only the β_2 -

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L 39919-65

ACCESSION NR: AT5005125

2

phase lines (see Fig. 1 of the Enclosure). The diffraction pattern of Hf showed only the α -phase lines. However, the patterns of all alloys with up to 70% Ta contained no α -phase lines but those of α' -phase, a supersaturated solid solution of Ta in α -Hf. The maximum solubility of Ta in α -Hf was about 5 wt%. Alloys containing 10—20% Ta quenched from 1100, 1300, 1500, and 1700C contained an ω -phase. The hardness of $\alpha + \beta_2$ alloys annealed at 900C changes linearly, but with annealing at 1100C, it sharply rises at the Ta concentrations at which the solid ω -phase is formed. Orig. art. has: 5 figures and 1 table. [MS]

ASSOCIATION: Institut metallofiziki AN UkrSSR (Institute of the Physics of Metals, AN UkrSSR)

SUBMITTED: 26Jun63

ENCL: 01

SUB CODE: MM

NO REF SOV: 002

OTHER: 016

ATD PRESS: 3191

Card 2/3

SHURIN, A.K.

Differential highly sensitive dilatometer with heating in an
inert atmosphere. Sbor. nauch. rab. Inst. metalloriz. AN
URSR no.18:222-225 '64 (MIRA 17:8)

L 41180-65 EWT(m)/T/EWP(t)/EWP(b)/EWA(c) P1-4 IJP(c) RWH/JD/JG
 ACCESSION NR: AP4046381 S/0020/64/158/003/0668/0670

AUTHOR: Svechnikov, V.N. (Academician AN UkrSSR); Dmitriyeva, G.P.; Kobzenko, G.F.; Shurin, A.K.

TITLE: Diagram of phase equilibria of the chromium-osmium system

SOURCE: AN SSSR. Doklady*, v. 158, no. 3, 1964, 668-670

TOPIC TAGS: phase equilibrium, chromium osmium system, eutectic alloy, eutectoid reaction, chromium alloy, osmium alloy

ABSTRACT: Alloys of Cr and Os were made in an arc furnace with a Cu, water-cooled hearth, in an argon medium. To eliminate possible dendrite liquation, the alloys were then subjected to homogenizing annealing at 1700C for 55 hrs. The phase equilibria diagram shown in Figure 1 of the Enclosure is of the eutectic type. The temperature of the eutectic reaction ($L \rightleftharpoons \alpha + \beta$) is $1840 \pm 10C$. The eutectic alloy contains 33 at. % (64 wt. %) Os. The γ -phase (Cr_2Os) forms after crystallization of the eutectic in accordance with the peritectoid reaction $\alpha + \beta \rightarrow \gamma$ at $1670 \pm 15C$. Upon further cooling of the alloys, there is a further decomposition of the γ -phase in accordance with the eutectoid reaction $\gamma \rightarrow Cr_3Os + \beta$ at $975 \pm 25C$. At 1670C, the γ -phase forms and decomposes under conditions of continuous heating and cooling. The compound Cr_3Os is obtained in accordance

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L 41180-65

ACCESSION NR: AP4046381

2

with the peritectoid reaction $\delta + \sigma \rightarrow \text{Cr}_3\text{Os}$ after prolonged annealing at $1540 \pm 40^\circ\text{C}$. Hence, cast alloys of Cr_3Os consist of a solid solution of Os in chromium (δ -phase). This same alloy, annealed at 1700°C , has the structure $\delta + \sigma$, and after annealing at 1500°C and below, Cr_3Os forms. The Cr_3Os has a certain region of homogeneity. An increase in Os from 0 to 25 at. % increases microscopic hardness (from 150 to 600 kg/mm²) and the crystal lattice (from 2885 Å to 2930 Å) of chromium. Cr_3Os has a hardness of 600 kg/mm², while the hardness of the σ -phase, depending on the composition, ranges from 1800 to 2000 kg/mm², and the hardness of the saturated β -phase is about 800 kg/mm². Orig. art. has: 3 figures and 1 table.

ASSOCIATION: Institut metallofiziki Akademii Nauk Ukr-SSR (Institute of the Physics of Metals, Academy of Sciences, Ukr SSR)

SUBMITTED: 25Mar64

ENCL: 01

SUB CODE: MM

NO REF SOV: 000

OTHER: 003

Card 2/3

L 41560-65 EWT(m)/EWP(w)/EPF(c)/EPF(n)-2/EWP(v)/T/EWP(t)/EWP(b)/EWA(c) 39
27
Fm-4 IJP(c) JD/JG/WB
ACCESSION NR: AT5008875 S/2601/64/000/020/0108/0124
B+1

AUTHOR: Alfintseva, R. A.; Dmitriyeva, G. P.; Korobeynikova, V. G.;
Pan, V. M.; Shurin, A. K.; Svechnikov, V. N. (Academician An UkrSSR)

TITLE: Investigation of ²⁷chromium-²⁷iron-²⁷molybdenum and chromium-iron-
tungsten alloys

SOURCE: ²⁷AN UkrSSR. Institut metallofiziki. Sbornik nauchnykh
trudov, no. 20, 1964. Voprosy fiziki metallov i metallovedeniya
(Problems in the physics of metals and physical metallurgy), 108-124

TOPIC TAGS: chromium alloy, iron containing alloy, molybdenum
containing alloy, tungsten containing alloy, alloy structure, alloy
hot hardness, alloy oxidation resistance 16

ABSTRACT: The following alloys have been investigated to determine
which ternary Cr-Fe-Mo or Cr-Fe-W alloy would provide the optimum
combination of the heat resistance of Mo or W and the ductility
of Cr: binary chromium-iron alloys containing 45-90% Cr, chromium-
molybdenum alloys containing 10-30% Mo, chromium-tungsten alloys
containing 10-30% W, and ternary alloys containing up to 55% Fe and

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L 41560-65

ACCESSION NR: AT5008875

up to 30% Mo or W. In Cr-Fe-Mo alloys containing 45—50% Cr, additions of up to 6% Mo do not improve hot hardness or oxidation resistance. Increasing Mo content leads to the formation of a brittle σ -phase which has a very low oxidation resistance in air at 1100C and lowers the oxidation resistance of the ternary Cr-Fe-Mo alloys in direct proportion to its content in the alloys. In Cr-Fe-W alloys, the single phase σ -region extends to about 32% W, but it tapers off at about 1275C. At high temperature (1450C), the single-phase region of α -solid solution with a b.c.c. lattice increases substantially, so that all the investigated alloys, except for an alloy containing 40% Fe and 30% W, became single-phase alloys at a more or less high temperature. A single-phase structure and a satisfactory ductility is readily preserved in all but three of these alloys by oil quenching from 1450C. Tungsten additions increase somewhat the melting temperature of Cr-Fe alloys, e.g., 30% W increases the solidus temperature by 100 and 150C in alloys with 40 and 50% Fe, respectively. Tungsten also increases the hardness of Cr-Fe-W alloys at both room and high temperature and does not impair their oxidation resistance. Orig. art. has: 8 figures and 3 tables. [MS]

Card 2/3

L 41560-65

ACCESSION NR: AT5008875

ASSOCIATION: Institut metallofiziki AN UkrSSR (Institute of
Metal Physics, AN UkrSSR)

SUBMITTED: 13Mar64

ENCL: 00

SUB CODE: MM

NO REF SOV: 003

OTHER: 007

ATD PRESS: 3234

me
Card 3/3

L 31568-66 E-T(m)/T/ETI/ETP(t) IJP(c) JD/JG/GD

ACC NR: AT6010590

SOURCE CODE: UR/0000/65/000/000/0159/0162

AUTHOR: Svechnikov, V.N. (Academician AN UkrSSR); Shurin, A.K.; Dmitriyeva, G.P.

ORG: Institute of Metal Physics, AN UkrSSR (Institut metallofiziki AN UkrSSR)

32
B+1

TITLE: The hafnium-chromium phase diagram 4

SOURCE: AN UkrSSR. Fazovyye prevrashcheniya v metallakh i splavakh (Phase transformations in metals and alloys). Kiev, Naukova dumka, 1965, 159-162

TOPIC TAGS: hafnium alloy, chromium alloy, alloy phase diagram

ABSTRACT: The Hf-Cr system was investigated by metallographic and x-ray phase analysis of Hf-Cr alloys prepared in an arc furnace and subjected to various annealing treatments. Differential thermal analysis was used to determine the temperatures of the start and end of fusion. The phase equilibrium diagram obtained is shown in Fig. 1. The eutectoid equilibrium $\beta \rightleftharpoons \alpha + \gamma$ was observed in Hf-rich alloys at $1300 \pm 10^\circ\text{C}$. Metallographic analysis of alloys annealed at 1500, 1200, and 1000C showed that alloys containing from 70 to 99.9 at.% Cr consist of two phases, and those with 99.95 and 99.97 at.% Cr have a single-phase structure. Thus, the solubility of hafnium in chromium was found to be 0.05—0.1 at.%; it remains practically unchanged as the temperature is lowered. Metallographic analysis of specimens annealed at 1200 and 1000C established that the solubility of chromium in hafnium does not exceed 2 at.% at these temperatures. The temperature of the polymorphous transformation in the compound HfCr_2 was found to be $1325 \pm 20^\circ\text{C}$. Orig. art. has: 1 figure and 1 table.

Card 1/2

L 31568-66

ACC NR: AT6010590

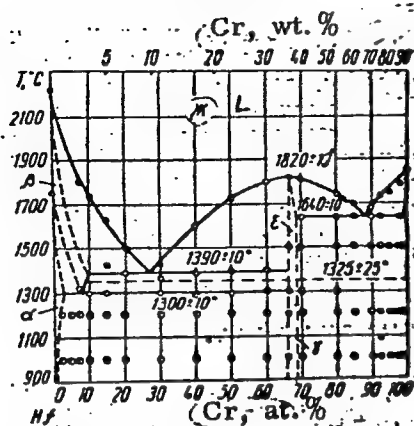


Fig. 1. Phase diagram of the hafnium-chromium system.

SUB CODE: 11 / SUBM DATE: 30Dec64 / ORIG REF: 001 / OTH REF: 002

Card

2/2 LC

1. Institut matematicheskoi fiziki i L'vovskiy gosudarstvennyy

universitet. Kiev. 1974. 112 s. (Ukrainian)

2. Institut matematicheskoi fiziki i L'vovskiy gosudarstvennyy

universitet. Kiev. 1974. 112 s. (Ukrainian)

L 24511-66 EWT(d)/EWP(h)/EWP(1)

ACC NRAP6007696

SOURCE CODE: UR/0413/66/000/003/0075/0075

AUTHOR: Krakovetskiy-Kocherzhinskiy, Yu. A.; Shurin, A. K.

ORG: none

14
TITLE: String-type dilatometer, Class 42, No. 178530 [Announced by the Institute of Physics of Metals AN UkrSSR (Institut metallofiziki AN USSR)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 3, 1966, 75

TOPIC TAGS: dilatometer, string dilatometer, elongation measurement, elongation

ABSTRACT: An Author Certificate has been issued for a string-type dilatometer for measuring the elongations of specimens of very small dimensions. ⁹⁴To improve the accuracy and simplify the measurement procedure, the indicator strings are positioned crosswise, and their point of intersection is within the visual field of reading microscope (see Fig. 1). [LD]

Card 1/2

UDC: 536/413/2/002/56

L 24511-66

ACC NR: AP6007696

0

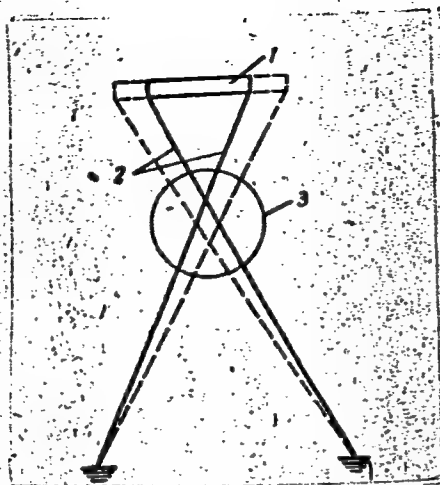


Fig. 1. String-type dilatometer.

1 - specimen; 2 - strings; 3 - microscope visual field

SUB CODE: 11,13/

SUBM DATE: 30Jan64/

Card 2/2

BLQ

5/11/1977
Name: SHURIN, A. T.

Dissertation: Benthonic fauna of the Gulf of Riga

Degree: Cand Biol Sci

Defended at
~~Affiliation:~~ Acad Sci USSR, Zoological Inst Acad Sci USSR, Academic Council

Publication
Defense Date, Place: 1956, Leningrad

Source: Knizhnaya Letopis', No 51, 1956

SHURIN, A.T., kand. biologicheskikh nauk

Bottom fauna of the Gulf of Riga and factors governing its
distribution. Trudy VNIRO 42:37-60 '60. (MIRA 13:9)
(Riga, Gulf of--Benthos)

SHURI , L.

Shurin, L. - "Engines", (On the history of technology), illustrated by
N. Yanitskiy, Znaniya--sila, 1949, No. 3, p. 9-14.

SO: L-4110, 17 July 53, (Letopis 'Zhurnal 'nykh Statey, k. 19, 1949).

SHURIN, P.S., inzh.

Specialization and cooperation in the electrical industry. Vest.
elektroprom. 31 no.3:75-76 Mr '60. (MIRA 13:6)

1. Glavnyy tekhnolog Novosibirskogo Giprosnergoproma.
(Electric engineering)

SHURIN, S.N.

Technical progress in cement plants in Novorossiysk. TSement
27 no.5:7-9 S-O '61. (MIRA 14:12)

1. Pervyy sekretar' Novorossiyskogo Gorkoma Kommunisticheskoy
partii Sovetskogo Soyu a.
(Novorossiysk--Cement industries)

USSR / Human and Animal Physiology. Blood Circulation.

T-4

Abs Jour : Ref Zhur - Biologiya, No 1, 1959, No. 3398

Author : Shurin, S. P.

Inst : Novosibirsk Medical Institute

Title : Some Data on the Role of the Central Nervous System
in the Process of Formation and Development of Experi-
mental Endomyocarditides. Preliminary Report

Orig Pub : Tr. Novosibirskogo med. in-ta, 1957, 27, 74-94

Abstract : Studies were conducted on 104 normal non-sensitized rabbits. When the carotid artery of 10 rabbits was infected with blood taken from a patient with rheumatism and processed with hyaluronidase, inflammatory changes appeared in the cardiac muscle more often than when other modes of administration were used. Upon introduction into the carotid artery of a hyaluronidase-treated extract from the valves and myocardium of a

Card 1/3

ZALSSKIY, G.D., prof., VOROB'YEVA, N.N., prof., PIROGOVA, O.I., SHURIN, S.P.
KAZNACHEYEV, V.P., YAVOROVSKAYA, B.Ye., FEDOROV, A.I., MOSOLOV, A.N.

Specific agent inducing rheumatic fever. Report No.1: Some data
on a filtrable virus isolated in rheumatic fever. Terap. arkh.
30 no.5:3-15 My '58 (MIRA 11:6)

1. Iz Novosibirskogo meditsinskogo instituta.
(RHEUMATIC FEVER, microbiology,
isolation & infect. of animals with specific virus (Rus))
(VIRUSES,
isolation & infect. of animals with specific rheum.
virus (Rus))

SHURIN, S.P.

Some data on the role of the lymphogenic spread of infection in the pathogenesis of experimental endomyocarditis. Terap.arkh. 30 no.5:15-21 My '58 (MIRA 11:6)

1. Iz kafedry fakul'tetskoy terapii (zav. - prof. G.D. Zalesskiy) Novosibirskogo meditsinskogo instituta.

(RHEUMATIC HEART DISEASE, experimental lymphatic spreading of infect. (Rus))

(LYMPHATIC SYSTEM, physiology, spreading of infect. in exper. rheum. heart dis. (Rus))

SHURIN, S. P., CAND MED SCI, "EXPERIMENTAL ^{studies} INVESTIGATIONS
ON REPRODUCTION OF RHEUMATIC CARDITIS IN RABBITS." NOVOSI-
BIRSK, 1959. (NOVOSIBIRSK STATE MED INST). (KL-DV, 11-61,
231).

-302-
~~-301-~~

DREYZIN, R.S.; YAVOROVSKAYA, V.Ye.; BALANDINA, A.M.; SHURIN, S.P.;
~~VORON~~YEVA, N.N.; MOSOLOV, A.N.; ZALESSKIY, G.I.; ZHDANOV, V.M.

Group of new virus strains, the so-called R virus. Vop. virus. 6
no.5:521-532 S-0 '61. (MIRA 15:1)

1. Institut virusologii imeni D.I.Ivanovskogo AMN SSSR, Moskva i
Novosibirskiy meditsinskiy institut, Novosibirsk.
(VIRUSES)

SHURIN, S.P.; YAVORSKAYA, V.Ye.; LOZOVY, V.P.

Detection of the virus isolated from patients with rheumatic fever
in a culture of fibroblasts with the aid of labelled fluorescent
serum. Vop.virus. 7 no.3:273-276 My-Je '61. (MIRA 14:7)

1. Iz kafedry fakul'tetskoy terapii i revmatologicheskoy laboratorii
Novosibirskogo meditsinskogo instituta.
(RHEUMATIC FEVER) (VIRUSES)